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Pierre Allard and Solène Denis

Abstract

Over the last twenty years there has been a considerable increase in data available on the Danubian lithic industries of Northern France and Belgium, in particular this is thanks to rescue archaeology. More than 200 sites can now be assigned to the Early Neolithic. The established temporal and chronological sequence reveals the succession of the Linear Pottery Culture and the Blicquy/Villeneuve-Saint-Germain Culture (BQ/VSG). The present contribution provides a synthesis on the circulation of flint raw materials during the Early Neolithic in northern France and Belgium. This paper attempts to carry out a diachronic analysis of this phenomenon in order to identify similarities or dissimilarities between these two Early Neolithic cultures. We hope, by doing this, to arrive at an understanding of the procurement territory related to the materials and of the social and economic organisation of the Linear Pottery groups.

Introduction: geographic, temporal and geological context

The geographic area considered here, i.e. northern France and Belgium, corresponds to the western margins of the area occupied by the Western Linear Pottery Culture (Fig. 1). In Belgium most of the Linear Pottery sites are located in Hesbaye and are related to the group of Linear Pottery sites of the Rhine/Limburg region. The expansion of the Linear Pottery Culture into the Paris Basin originates from both Alsace and the Meuse and Moselle valleys. These sites are mainly located in the eastern valleys of the Paris Basin. Yet some isolated discoveries have been reported outside this main area of distribution. The earliest sites are dated to 5200 BC while those established in the Paris Basin (*Rubané Récent du Bassin Parisien*) turn out to be of a later date (at about 5000 BC).

The expansion of the Blicquy/Villeneuve-Saint-Germain Culture is much more significant than the Linear Pottery Culture, as it encompasses the entire northern half of France as well as Belgium (Hainaut and Hesbaye). The Blicquy/Villeneuve-Saint-Germain Culture is dated between 4950 and 4650 BC (Dubouloz 2003).

The identification of the circulation of the flint materials is entirely dependent on the search for raw material sources. These are well documented for distinct sectors of the Paris Basin (Fig. 2) (also see Allard et al. 2005; Allard et al. 2010). The region can be characterised by two major geological formations: the landscapes formed by Cretaceous White Chalk and the Tertiary plateaus of the Île-de-France. The flint resources are abundant in the Upper Cretaceous levels (Turonian, Santonian, Coniacian, Campanian), in primary position in most of the sectors, as well as in the Eocene levels of the Tertiary basin. These sources were extensively exploited by the Early Neolithic groups.

In Belgium the issue of flint sources is much more difficult given that there is currently not a single systematic reference collection. Nonetheless, a very general description of the flint sources is available (Cahen et al. 1986), based on which the main sources in the Cretaceous formations of the Haine (Hainaut) and the Meuse basins (*Hesbaye liégeoise*) can be located. More precisely, two types of flint stem from these outcrops: fine-grained Hesbaye flint and a variety of coarse-grained flint. In the Hainaut region the Cretaceous formations of the Mons basin (corresponding to the north-eastern extension of the geological Paris basin) host abundant and various potential lithic resources (Turonian, Santonian, Coniacian or Campanian) (Allard 2005; Denis 2014). However, the sources of the different varieties exploited by the prehistoric groups are not always well described. This is the case for the so-called Ghlin flint, largely used by the Blicquy culture. It is worth mentioning that Spiennes flint is almost unused during the periods we are concerned with here.

Below is a short synthesis on the organisation of the production and the circulation of flint raw materials during the Linear Pottery Culture and the BQ/VSG Culture.

Circulation networks of flint during the Linear Pottery Culture: different levels of intensity

It can be assumed that the chipped stone industry, related to the first farming groups of the Central European Linear Pottery Culture, is quite standardised and hardly diversified, despite the considerable size of its area of distribution.

As a matter of fact, strong similarities can be identified between all the regions, notably with regard to blade

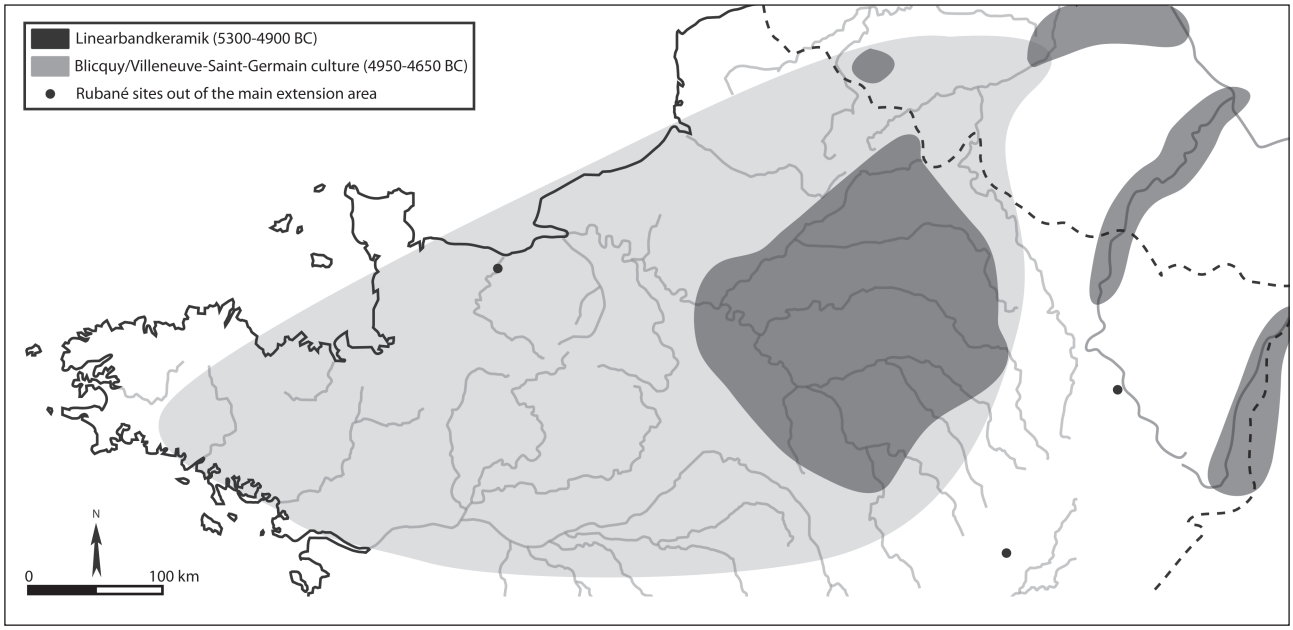

Fig. 1 Geographic localization of the Linear Pottery Culture and the Blicquy/Villeneuve-Saint-Germain (BQ/VSG) Culture.

production or tool-kit composition. Blade production largely prevails (except in some rare cases) and so we are dealing exclusively with a debitage of small blades made by indirect percussion (with an average length of 6-10cm). The same can be said about the types of tools, which are mainly scrapers, sickle elements, borers and blades with varying retouch. The tool-kit is hardly diversified and rather monotonous. Most of the tools were also made on *ad hoc* blanks, thus showing a very simple blank management and tool production/shaping (Allard 2005). Annex productions are rare and they mostly concern expedient flake productions which are used unretouched and discarded rapidly (for example the debitage of rock crystal pebbles: Mauvilly 1997). Finally, the production is considered to be domestic. Almost all the data show that the production of lithic blanks is managed by each household (Allard 2005; Allard and Burnez-Lanotte 2008; de Grooth 1987; Mauvilly 1997).

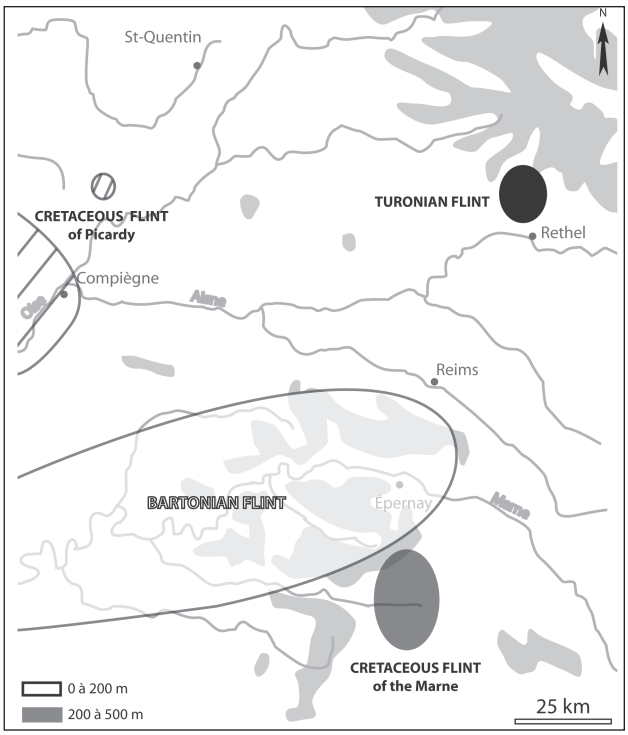

Fig. 2 Localization of the raw material outcrops used during the Early Neolithic Period in the centre of Paris Basin.

The studies conducted into the flint procurement of the Central European Linear Pottery Culture Linear groups agree on several aspects with regard to the management of the flint sources. Contrary to an initial widely shared assumption (Plateaux 1993), these groups frequently use varying materials of high quality for blade debitage (Allard 2005; Zimmermann 1995). The most frequent case corresponds to regional materials (20-40km) which are shaped and knapped at the extraction sites and then transported to the household in the village. The establishment of the hamlets is indeed mainly oriented towards agricultural land and flint resources seem not to be a determining factor taken into account by these groups. On the contrary, amongst the procurement sources of the different types of materials (for example: flint, hard rocks, ornaments) regional sources prevail and exogenous sources occur almost systematically (Bakels 1978).

Polish researchers observed very early on that the acquisition of flint was in fact a complex system based on the social and economic relationships between the occupations amongst which different types can be distinguished, ranging from extraction sites (which, as far as we know, are invariably disconnected from the settlements strictly speaking) to redistribution and consumption sites. These flint pieces, circulating in various forms (cores and blades), are organised in real networks that diffuse the products over large distances and connect the settlement areas over hundreds of kilometres. In addition, small quantities of

flint also circulate and they are interpreted as evidence of contacts between the different village communities (Lech 1987; 2003).

In a settlement context, the discovery of heaps of knapping waste related to the production of large quantities of blades raises the question of an overproduction compared to the needs of the village. This is a well attested phenomenon in several Western European regions, as for example at Verlaine in Hesbaye Liégeoise (Burnez-Lanotte and Allard 2003), at Beek Kerkeveld in Dutch Limburg (de Grooth 1987) and at Hanau-Klein Auheim in Germany (Sommer 2006).

Within our study region, it can be clearly stated that the diffusion networks were established concomitantly to the emergence of the first Linear Pottery villages. All the regions are affected by these flint diffusions. We will not go into detail here about these observations, which are described in more detail elsewhere (Allard 2005; Zimmermann 1995). Two important aspects have to be taken into account (Fig. 3):

Firstly, these networks diffuse products depending on different levels of intensity which we have ranked according to the impact of the materials on the economic management of the blanks in each village. Thus Hesbaye, Rijckholt and yellow-coloured Campanian flint are the three flint types showing strong intensity of diffusion. Distinct regions are provided with blanks for common tools.

There are also small-scale circulations of some pieces of Tertiary Bartonian flint or of Ghlin flint (outcropping between the Paris Basin and the Mons Basin in Belgium). The presence of several tools made from blades have been found, attesting to contacts between the different regions.

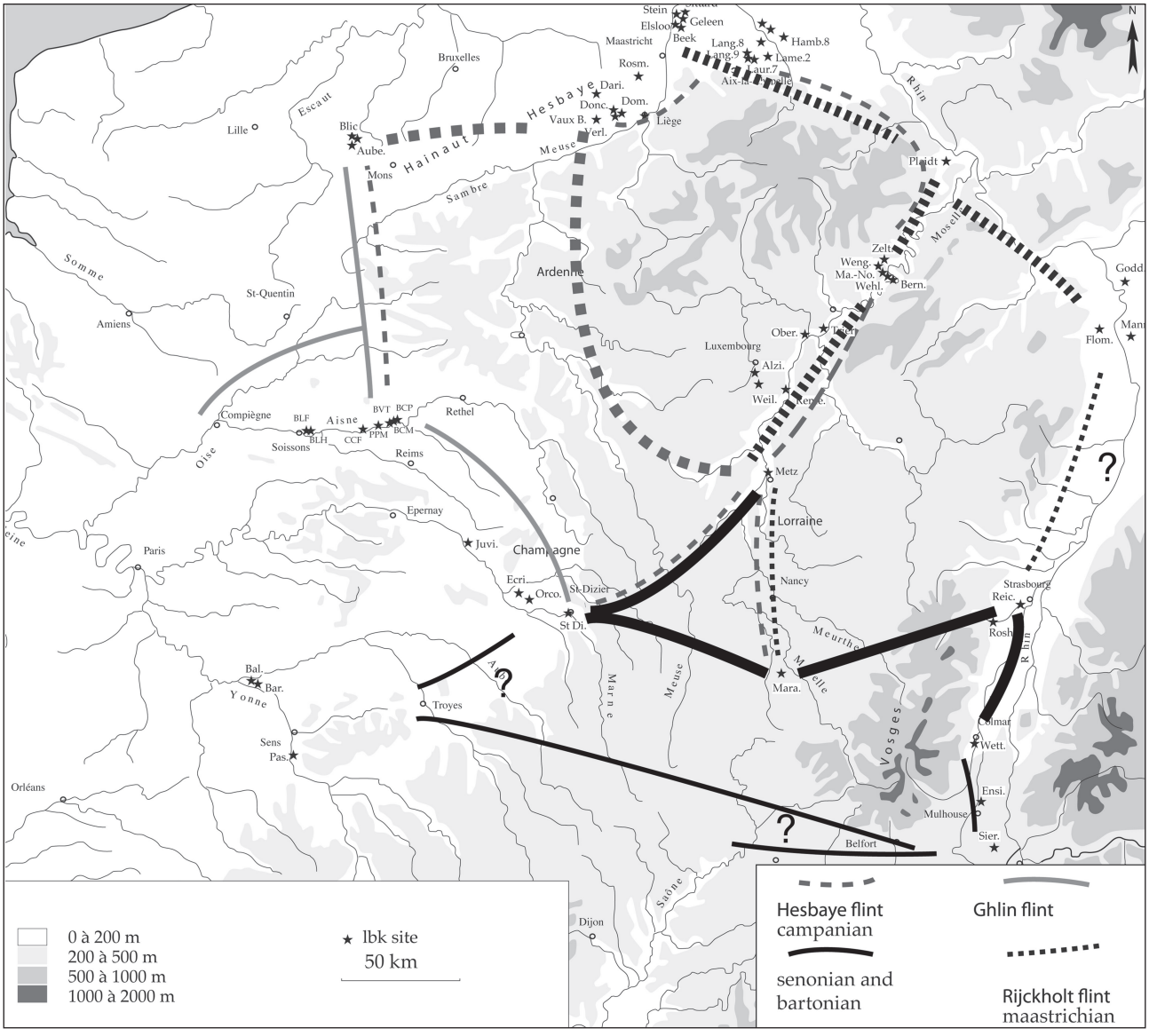

Fig. 3 The circulation networks of flint in Northern France, Belgium and Western Germany (Linear Pottery Culture). The width of the lines shows the intensity of the networks.

Circulation of flint during the BQ/VSG Culture: the emblematic case of Tertiary Bartonian flint

The lithic industry of the BQ/VSG Culture stands out by concomitant blade and flake production (Fig. 4) (Allard 1999; Augereau 2004; Bostyn 1994). The respective parts of the different productions vary considerably from one region to the other, although the domestic flake production is systematically dominant. Blank production only represents 10-40% of the BQ/VSG assemblages.

It should be taken into consideration that the flakes and blades are not made by the same knappers (Augereau 2004). Flake production undeniably requires a lower level of skills than blade production, given that it is made by hard percussion without initial preparing of the blocks, most often by linked sequences of unipolar debitage (Allard 1999).

The operational sequence of blade debitage is similar to the one practised by the Linear Pottery Culture. Shaping is made by the creation of one or more ridges. Debitage, done by indirect percussion, is unipolar and semi-turning to turning. The striking platforms are faceted and the overhangs frequently prepared by slight abrasion. The desired blanks are regular, generally tripartite blades, with a length of between 8 and 10cm, a width of between 18 and 25mm, and a thickness of between 4 and 6mm (Allard and Denis 2013; Bostyn 1994).

Despite distinct variability according to the contexts, these productions are seemingly made from local or regional materials. In contrast to the Linear Pottery Culture, the search for high-quality materials is no longer based on the distance from the exploited sources. Nonetheless, amongst the local or regional potential, blocks of flint of higher quality are preferred for laminar production (Allard 1999; Augereau 2004; Bostyn 1994; Riche et al. 2010).

The presence, however, of very small numbers of artefacts stemming from exchange can be frequently observed. In the current state of research, the circulation of flint raw materials during the BQ/VSG Culture mainly concerns

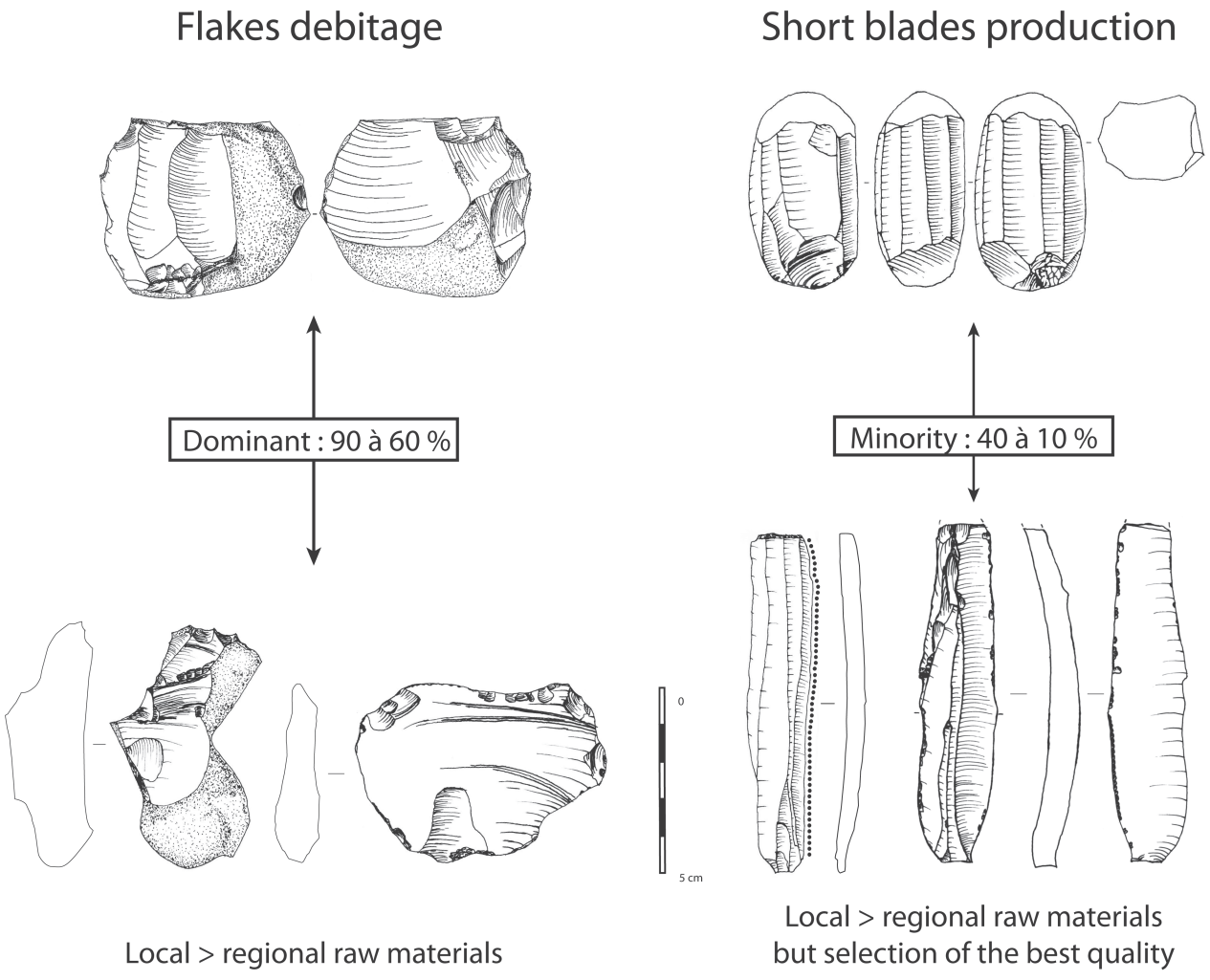

Fig. 4 Main productions realized during the Blicquy/Villeneuve-Saint-Germain Culture.

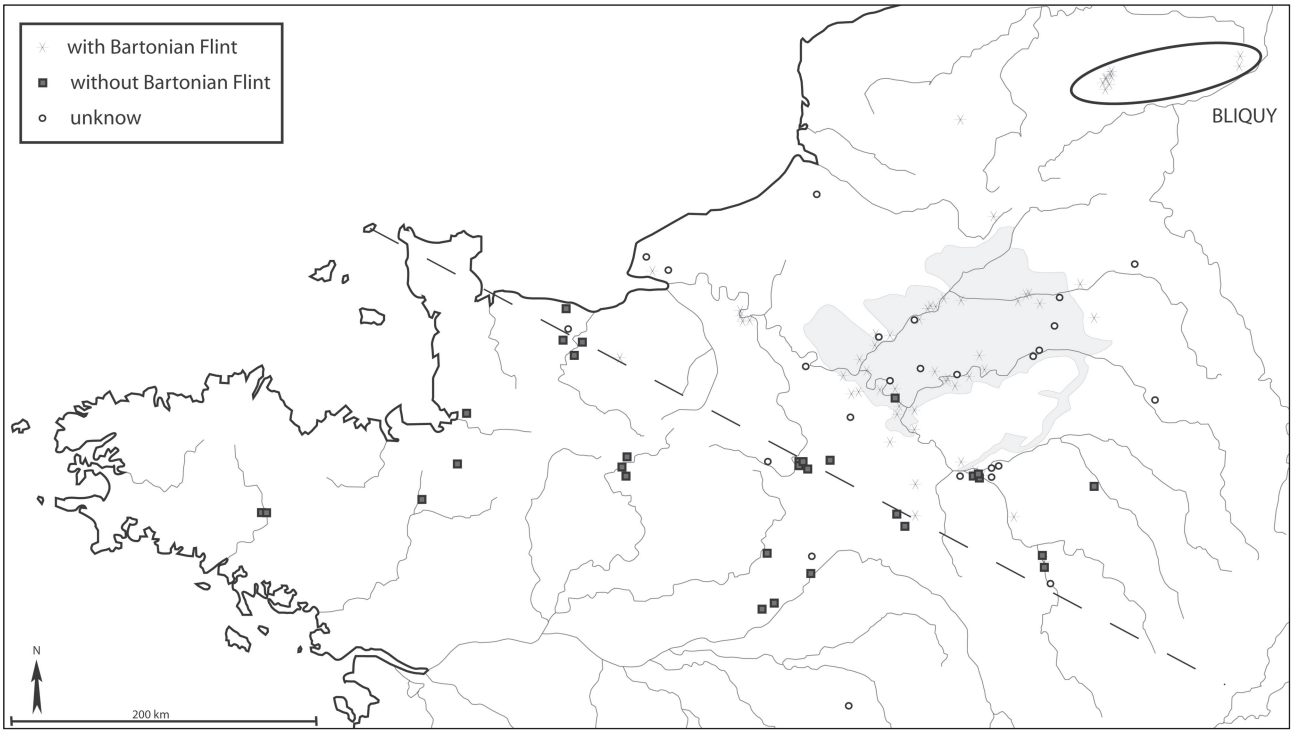

Fig. 5 Map of BQ/VSG sites, localising the tertiary bartonian flint.

one material: Tertiary Bartonian flint. The circulation is so emblematic of this culture that a blade made from Tertiary Bartonian flint was quoted as being a "marker of cultural identity" (Allard and Bostyn 2006, 41; Bostyn 2008, 410).

The circulation of Tertiary Bartonian flint is undisputed (Plateaux 1990a; 1990b; 1993). The first proposed models (Augereau 2004; Bostyn 1994) served as a basis for a re-examination of the data following the important increase of VSG sites (Denis 2012). Without pretending to be exhaustive, the present study is based on 115 BQ/VSG sites reported from the literature. From this, it appears that more than half of these sites yielded Tertiary Bartonian flint (52%) (Fig. 5). Twenty-six percent of the sites did not contain this flint type at all. In the absence of detailed data on the raw materials, no diagnostic could be established for 22% of the sites.

Except for some very rare cases, the sites located in the tertiary basin all yielded artefacts made from Tertiary Bartonian flint. However, some of the settlements are located as far as 50km from the sources. The Tertiary Bartonian flint has also been identified outside the tertiary basin, as it is seen at the sites discovered further down the river Seine (Blancquaert et al. 1995; Bostyn et al. 2003; Riche et al. 2010), or at those of the Blicquy group in Belgium (Bostyn 2008; Caspar and Burnez-Lanotte 1994; Constantin 1985; Jadin et al. 2003).

So not only are the number of sites linked to this circulation important; the circulation itself also sometimes occurred over large distances (up to a maximum of 200km from the sources) (Fig. 2).

The geographic distribution of the sites that have yielded Bartonian flint demonstrates a real boundary isolating the VSG settlements in the south-western part of the distribution area of the BQ/VSG Culture. This enclave is possibly related to the existence of a competing circulation network, the Cinglais flint network (Marcigny et al. 2010).

Tertiary Bartonian flint thus circulates in significant numbers within the BQ/VSG Culture given the extent of its distributional area: the northern half of France and Belgium, a circulation over a distance of nearly 200km. The emblematic character of this circulation is also mirrored by the nature of the circulating goods: long blades, a non-standard production designed to enter into circulation.

In effect, the blades made from Tertiary Bartonian flint entering into circulation are mostly long blades (Denis 2012). Their length is between 14 and 20cm. This is a significant difference from the laminar productions made from local or regional flint, which rarely exceed 10cm in length (Fig. 6).

Within the centre of the tertiary basin, this dichotomy can also be recognised: not all the sites produce long blades. Only six settlements seem to be producers of long blades made from Bartonian flint. At the same time, a prevailing production of small blades made from Bartonian flint systematically occurs at these sites (Denis 2012).

It appears that the production of long blades, a minority in the BQ/VSG Culture and occurring in distinct settlements only, is the preferred characteristic for material entering into circulation.

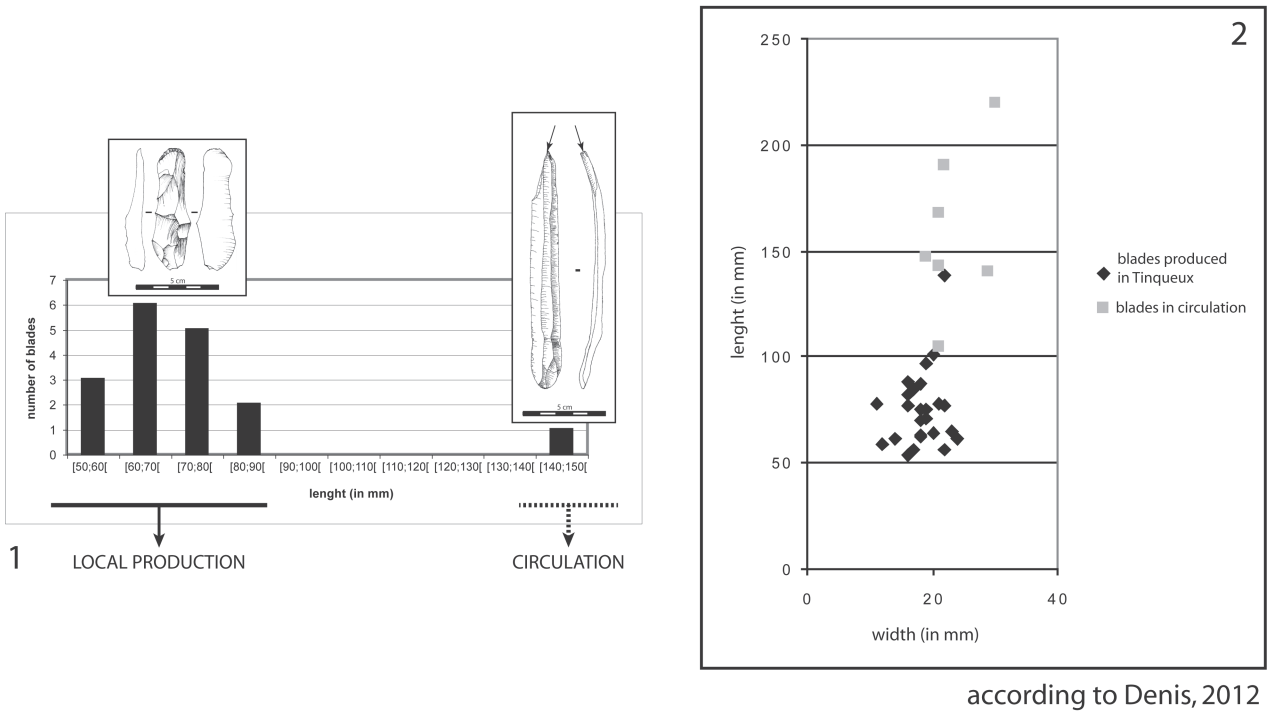

Fig. 6 Length of the bartonian blades: the difference between short blade production and long blade circulation. 1- Example of the site of Vasseny (Aisne): difference between short blades produced on-site and an imported long blade. 2- Example of Tinqueux 'la Haubette' (Marne): difference between blades produced in Tinqueux and entire blades entering circulation.

More broadly, the operational sequence of the debitage of these long blades made from Bartonian flint does not show significant differences with that of the production of small blades. Nonetheless, the care implemented at each critical stage of the operational sequence has to be stressed (Bostyn 1994). In addition, "the difficulty of creating long regular pieces grows exponentially to their size" (Pelegrin 2003, 142). This production of long blades made from Tertiary Bartonian flint therefore requires greater skills than the production of small blades. All these elements suggest that the production of long blades made from Bartonian flint was a specialised production from a technical and economic perspective: outstanding skills compared to local production, a specific production designed to circulate.

This search for long products is quite ambivalent, as these blades were rarely kept intact for their use. According to Bostyn, the blades made from Bartonian flint discovered in the Blicquy context were used for the purpose of craft activities specific to the Blicquy/Villeneuve-Saint-Germain culture (Bostyn 2008, 403). This argument needs to be validated for the other sites.

In the current state of research, the circulation of Tertiary Bartonian flint seems to be active along the entire sequence of the BQ/VSG Culture. Only a few sites are dated to the early stage of this culture but the two Blicquy sites of Irchonwelz attributed to this stage have yielded Tertiary Bartonian flint including fragments of long blades (Bostyn 2008). An important number of sites dated to the middle and recent stage participate in the circulation network of Tertiary Bartonian flint. Several sites belonging to the middle stage have been identified in the area further down the river Seine. During the entire sequence, the Seine-Yonne sector yielded artefacts made from Tertiary Bartonian flint. The presence of nearby sources is, however, not excluded (Allard 2005).

Two aspects seem to indicate that the links between the centre of the Paris Basin and Belgium are the most active. On the one hand, the numbers of pieces of Bartonian flint seem to be higher at the Blicquy sites than at the VSG sites with the longest distance from the centre of the Paris Basin such as the sites of the Vaudreuil loop (Bostyn et al. 2003; Riche et al. 2010). On the other hand, Tertiary Bartonian flint circulates in the form of blades in these sites. In contrast, the sites in Belgium received pre-shaped cores that were knapped locally (Bostyn 2008).

The modalities of circulation of this flint type differ according to the regions and seem to indicate a stronger attraction between the Blicquy sites and those located in the centre of the tertiary basin.

The circulation of Tertiary Bartonian flint is emblematic of the BQ/VSG Culture given the quantities in circulation, the number of sites concerned, and the existence of a specific production of long blades designed for circulation for a use which is *a priori* oriented towards craft activities typical of the BQ/VSG.

In no case does this circulation of long blades made from Tertiary Bartonian flint meet a pressing need. In all the sites to which the Tertiary Bartonian flint circulated, these co-existed with laminar production made from local flint. This

latter production led to small blades, but the length of the blades made of Bartonian flint seems not to be necessary related to their use. The blades are frequently fragmented and, though their use refers to activities specific to the BQ/VSG Culture, they are not restricted to long blades. Moreover, these blades are singular in distinct sites, which would not be enough to address a lack if this existed.

Thus, everything seems to indicate that the Bartonian blade is indeed a real marker of cultural identity (Allard and Bostyn 2006; Bostyn 2008). In addition, its length distinguishes it from the products of common consumption, as its size represents a distinct display value. This production seems also to be related to a specific social and economic organisation. The production of long blades made from Bartonian flint is exclusive to some sites and the knappers had particular skills.

Comparisons between the Linear Pottery Culture and the BQ/VSG Culture

The brief overview of the circulation networks of flint products during the Linear Pottery Culture and the BQ/VSG Culture enables the comparison between both groups. These networks highlight clear differences between the Linear Pottery Culture and the BQ/VSG Culture (Fig. 7).

The first difference relates to the raw material procurement. With regard to the Linear Pottery groups, procurement is oriented towards high quality flint, sometimes at the expense of local sources. This trend is reversed during the BQ/VSG Culture, when local resources are preferred. In addition to this, the differences in raw material procurement are accompanied by a change in the organisation of the productions.

Production during the Linear Pottery Culture is almost exclusively laminar, whilst flake production dominates during the BQ/VSG Culture. The domestic production in the Linear Pottery Culture does not require great skills. In effect, the quality of the raw material used is much more important for the successful progress of this operational sequence as it generally does not require any predetermination. Nonetheless, it is true that the same flint types can be used to produce blades. In this case, the obvious choice is to select the best blocks of flint.

In addition, the circulation of flint materials during the Linear Pottery Culture is an inherent part of the flint assemblages and attests to relations between all the settlement areas of the Linear Pottery Culture. In regions with abundant high quality flint the presence of small numbers of exogenous flint pieces is common. In some regions, the absence of sources or the poor quality of the flints is compensated by significant 'imports' of extra-regional flint. The ability of the Linear Pottery groups to establish real economic networks proves that the presence or absence of flint materials in the surroundings was not a determining criterion for the foundation of villages (Allard 2012, 269). However, this production "is not different from the classical production found everywhere, in all the villages as well as in all the households" (Allard 2012, 268). This type of specialisation in lithic production attests to a high level of skills of the knappers, whose expertise is oriented towards the production of blanks matching the Linear Pottery 'standard'.

In the current state of research the circulation of flint products associated with the BQ/VSG Culture is completely different. Primarily, unilateral circulation during the BQ/VSG contrasts with multidirectional circulation during the Linear Pottery Culture. The circulation of Tertiary Bartonian flint clearly appears more active during this period, although the number of pieces in circulation remains very small. Amongst the most distant sites, those presenting more than 2% of Bartonian flint within their assemblages are rare. In addition, this circulation never meets a technical or economic need. The

	LINEARBANDKERAMIK	BQ/VSG CULTURE
Procurement	orientated toward flint of **good quality** in spite of the existence of local raw materials	mostly orientated toward **local raw materials**
Productions	**blades** in majority	**flakes** in majority>short blades
Circulation (raw material)	Frequent circulation of different kinds of flint. Most active circulations of **Hesbaye and Rijckholt flints**	In the actual state of our knowledge, most important circulation = **Bartonian flint**
Circulation (type of goods)	common blades	long blades
Production centers	economic surplus + specialized production	production of unusual blades by specialized producers
	high socio-economic impact	**display value and cultural affiliation**

Fig. 7 Synthesis table: comparison of the circulation of the raw materials between the Linear Pottery Culture and the Blicquy/Villeneuve-Saint-Germain Culture.

local materials, even those of poor quality are sufficient for the subsistence of the BQ/VSG villagers. On the other hand, the long blades (14-20cm) are mainly destined to enter into circulation. The long blades thus differ from the laminar production made from local flint. Moreover, this production of long blades is exclusive only in distinct sites located near the outcrops. Therefore, the skills necessary to produce these long blades do not exist among the receiving and consuming groups. In contrast to the Linear Pottery Culture, it is no longer the 'standard' products that circulate but rather the 'non-standard' products. Moreover, the length of these blades has no impact on their use. Thus, the circulation of these long blades reveals a type of display, a real "marker of cultural identity" (Allard and Bostyn 2006; Bostyn 2008). The circulation of Tertiary Bartonian flint towards the sites of the Blicquy group in Belgium seems to be the most significant. Long blades made from local so-called Ghlin flint are repeatedly reported (Cahen and Van Berg 1979; Cahen et al. 1986; Constantin 1985). At the same time, the relations between the VSG and the Blicquy groups still need to be detailed.

Conclusion: changes in the social and economic organisation between the Linear Pottery Culture and the BQ/VSG Culture

The analysis of flint circulation during the Early Neolithic in Northern France and Belgium demonstrates significant differences amongst the first farming groups of north-western Europe. Profound changes affected the social and economic organisation of the Linear Pottery and Blicquy/Villeneuve-Saint-Germain groups, and these changes can be recognised through the circulation of flint materials. Flint circulation is an essential aspect of the Linear Pottery economy, and in distinct cases this movement of materials mirrors a real dependence between the different groups. The identification of an overproduction of blades made of fine grained Hesbaye and Rijckholt flint illustrates the importance of the demand. This specialised production led to the manufacture of standardised blanks that conformed to the model created in the domestic field. Inversely, the management of the flint resources shows that local sources are preferred by the Blicquy/Villeneuve-Saint-Germain groups. The circulation of flint materials no longer meets the need to provide goods of common consumption. On the contrary, long blades that do not correspond to the standard of laminar production made in the household preferentially circulate and are probably made by real 'experts' (Bostyn 1994; 1997). It is also interesting to stress that Tertiary Bartonian flint is the only material which seems to supply these networks. This confers a real display value and cultural identity on the long blades made from Tertiary Bartonian flint.

Finally, the changes in the circulation of raw material which are recognisable through the lithic industry need to be connected with other fields of the groups' material culture in order to identify structural changes in progress and the social and economic value of exchange within these first farming groups.

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